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NOTES ON THE DESCRIPTION OF LAND FORMS.—I.

THE KAMERUN REGION. By K. Hassert. (Forschungs-Expedition ins Kamerun-Gebirge und ins Hinterland von Nordwest Kamerun. *Zeitschr. Gesellsch. Erdk,* Berlin, 1910, 1-35.) An observer's manner of presenting the facts that he has observed is so intimately bound up with a reader's appreciation of the facts as they are verbally presented, that the reader's attention may sometimes be profitably directed to the terms and phrases employed by the observer, as well as to the things that the terms and phrases represent. In the same way, the general method that underlies a description is of interest, as well as the things that are described. The article above cited is significant in both these respects. It opens with a concise explanatory characterization of the region visited, phrased for the most part in technical terms, from which the reader may at once conceive a mental picture of its leading features, and thus prepare himself for the readiest understanding of the later pages, which are presented in a partly explanatory, partly empirical narrative. The opening characterization is, in brief, as follows:

The region visited consists chiefly of granites and other crystalline rocks, which during a long existence as a land area were worn down to moderate or small relief, and then broadly but not completely covered with sheets of trachyte and basalt. The compound mass was afterwards fractured in all directions, and the blocks into which it was thus divided were irregularly displaced, long enough ago for the higher ones now to be elaborately dissected, while some of the lower ones have been aggraded. Young volcanic cones also occur, sometimes holding lakes in their craters. Waterfalls are abundant in the highlands.

The evidence on which this general statement is based is not presented in the article above cited, but is presumably to be found in the *Mitteilungen aus den Deutschen Schutzgebieten,* to which reference is made. It is, however, not with that evidence that we are here concerned, but with the presentation of the conclusions based upon it. The presentation is most lucid; it leaves no feeling of inaccuracy or uncertainty in the mind of the reader, who must be greatly aided in coming on the essence of the whole story at the beginning of the article, so that the items of form mentioned in the succeeding narrative may be immediately assigned to their proper place in the region as a whole. The reader may thus from the outset and without difficulty form a sufficiently defined mental picture of the upland blocks, limited by abrupt but dissected scarps and traversed by the ramifying gorges of young streams, and of the intermediate lower lands, on which the rivers flow little below the general surface; and then bearing this mental picture in mind he may hope to give the details presented in the succeeding pages their proper rank. This hope is generally gratified, for the narrative makes frequent mention of dissected scarps, lava-capped cliffs, deep gorges and broad plains, which can for the most part without difficulty be given their appropriate location; but the reading of the article would have been still easier if its items had been somewhat more explicitly stated in terms of the introductory scheme; and more geographical illumination would have resulted had more frequent and more explicit correlation been attempted between the land forms and the conditions of human occupation. Unfortunately, some of the pages are largely empirical, and it is then difficult to conceive the relative positions of the elements that make up the landscape.

For example, one reads in effect: "The constantly ascending path led us to a grass-covered surface, dissected by gorges . . . Suddenly the wide plain of Bangem opened before us. A sharp cone rose out of it like an island . . . We descended rapidly . . . to Nyandong . . . and near a bold rocky peak, that dominated the district like a Matterhorn, we crossed the Mwe, a fine river which flowed into a rock-walled gorge . . . We next entered a deeply dissected forested mountain mass . . . where the road was bad and fatiguing" (pp. 11, 12). One may here easily infer that the grass-covered surface, reached by an ascending path, was one of the uplifted blocks; that the wide plain of Bangem was an aggraded depression; and that the Mwe flowed, as if in antecedent fashion, from a depressed block into and through an elevated block; but it would surely be easier for the reader, and safer also, if these matters had not been left to inference, but had been explicitly stated by the writer. The larger part of this excellent article makes so successful a departure from the empirical style of geographical description prevalent in the pages of geographical journals, that one must wish that its explanatory method had been extended so as to characterize all its paragraphs, instead of nearly all. For those paragraphs which are characterized by explanatory treatment many a reader must be warmly thankful.

THE GLACIERS OF THE VENETIAN ALPS. By O. Marinelli. (I ghiacciai delle Alpi venete. Memorie geografiche, No. 11, 289 pp. Florence, 1910; many plates and figures.) This painstaking memoir contains many years' records of persevering study by one of the most active and progressive of Italian geographers. The work is a masterpiece of thoroughness outdoors and in; for the author has not only examined every little glacier in the mountains, but has brought together and discussed an elaborate bibliography. The greater part of the memoir (pp. 10-159) is devoted to a detailed description of individual glaciers. Then follow (pp. 160-246) sections on classification, erosive action, moraines, and other general matters; and finally a chapter (pp. 247-278) on the climatic limit of snow in this mountain group.

In point of method, this work offers an interesting contrast to the article previously cited. The author contents himself with purely empirical descriptions on the earlier pages, while giving an account of the existing glaciers, item by item, but in the later pages he enters upon explanation and generalization. He there recognizes that the forms of the mountains have been largely affected by the erosive action of the great pleistocene glaciers; and he explicitly points out that certain neighboring cirques may have been thus enlarged from their earlier armchair form, and eventually converted into the semblance of a sofa by the partial or entire destruction of the intermediate spurs (186-188). This suggests that the acute and serrate ridges represent the reduced and sharpened remnants of larger and more rounded preglacial features. The author also concludes that the little glaciers of to-day, although they are accomplishing some small measure of erosive work, have but slightly changed the forms left by their predecessors. It therefore follows that the sites of the existing glaciers might be described in terms of the work done by the ancient glaciers; yet, as above stated, the descriptive pages of the first part of the memoir give hardly a hint as to this illuminating conception. The terms there employed are all empirical, such as culminating point, rocky or vertical walls, channels, rocky spur, cavity, cirque, "conca," and "vallone." Even such phrases as a "conca hardly meriting the name of a cirque," or "a kind of elongated rocky cirque," do not express the forms thus described in terms of their origin.

In view of the great progress that has been accomplished in recent years respecting the series of mountain forms developed during the modification of normal valley heads by the erosive action of growing glaciers, it seems ultra-conservative to make no use of this progress in a matter so closely pertinent to it as the description of the small glaciers of to-day that occupy cirques excavated to various degrees of development by former greater glaciers. The whole trend of modern physical geography is toward the use of explanatory description, as far as it appears reasonably assured, especially in scientific memoirs. Explanatory description is, moreover, the most effective kind of description, because the terms in which it is phrased are so much better defined, and therefore so much more easily conceived, than empirical terms. Hence, it is to be regretted that the well grounded considerations which lead to the interpretation of cirques as glacially excavated valley heads in various stages of development should be postponed to the later pages of a memoir, in the earlier pages of which these considerations might have been put to practical use as furnishing the best means of concisely and intelligibly describing the higher parts of strongly glaciated mountains, in which the small glaciers of to-day linger.

EXPLORATIONS IN BOLIVIA. By P. H. Fawcett (*Geogr. Journ.* xxxv, 1910, 513-529). This paper may be taken as an example of an entertaining and lively account of an arduous journey. The author describes travel in Bolivia as beset with dangers, difficulties and discomforts of many kinds, including Brazilian outlaws, revengeful savages, tangled and thorny undergrowth in pathless forests, heavy nuts that fall 100 feet or more with bone-breaking force, wild beasts on the land and ravenous fishes in the rivers, innumerable insect pests, and dreadful diseases. Hence it is natural enough that one who survives a visit to the interior of that country should return home well supplied with personal incident with which to lighten his report; but it is regrettable that, as a result, the objective description of the country itself should be for the most part relegated to the background. Physiographic observation was presumably difficult, all the more so as much of the journey was made in boats on forest-lined rivers that traverse plains; yet, as the author's first avowed object was to give "a general idea of Bolivia as it is to-day," something more specific about hills and plains and rivers would have been helpful. It is, however, highly significant of the unsystematized condition of present geographical methods that, when occasional mention is made of the landscape, which constitutes the stage on which all the Bolivian players act their parts, its features are presented to the mature readers of one of the leading geographical journals of the world chiefly in terms of the elementary nouns of school-day geography lessons, qualified with somewhat more grown-up but still untechnical adjectives. One reads such phrases as "across the passes of the Cordilleras are mule tracks following the long hog-backed ridges which extend like the tentacles of an octopus into the eastern forests," "mountain torrents which cut a roaring and resistless passage through their valleys of slate, gneiss and sandstone," and "a coffee-colored river cutting a sinuous course in a red lacustrine deposit"; but there usually is a disappointing absence of effective landscape description.

One of the few more significant statements is: "In the forest the accidents of the land-surface are for practical purposes [such as boundaries?] unrecognizable . . . No watershed is easily recognizable in the forests of this region" (524). A few more words here would have been very helpful in indicating the nature of the forest-covered plain: whether it is all subject to river inundation, as a large part of it would appear to be; or whether the flood plain area is really restricted to belts of moderate width, which stand a little lower than the rest of the plain. The latter would sometimes appear to be the case, for mention is made of the "great grass plains which lie inside the belts of rich forest bordering the rivers" (p. 515); but as the relative altitude of the grassy plains and the forested plains is not explicitly stated, the reader is left to inference where he would be glad to have observation. To be sure, topographical exploration in the forest must be extremely difficult, and likely enough no decision could easily be reached regarding the alternatives above suggested; but in that case even an explicit statement of mere inference or even of uncertainty by the observer would have been helpful to a reader who wishes to follow the author's account of "Bolivia as it is to-day."

The hills of Ricardo Franco are described as of exceptional relief; they "rise abruptly from the forest plains to a height of over 3,000 feet, crowned by formable precipices . . . reported . . . as impassable, owing to the terrific gorges which cut up its sandstone formation" (p. 525). When the explorer crossed these hills, he found "the very accidented plateau . . . covered by long coarse matted grass, beneath which . . . the surface is strewn with sharp boulders . . . Day after day we came suddenly upon deep gorges, necessitating long détours . . . A few days later we got down with difficulty to the forest" (p. 527). The reader may perhaps picture this plateau as being capped with horizontal sandstones on a base of some weaker structure, elaborately dissected by retrogressive insequent gorges and ravines. If this be the case, it would seem to have been an easy matter for the author to make explicit statement of the significant facts, and thus relieve the reader from the uncertainty in which he must otherwise remain. Surely, the addition of a few technical or explanatory terms, like horizontal sandstones and mature insequent ravines, or something of like nature, would not be out of order in an article which abounds with strange words like pium, tucandera, chunta, espundia, barracas, haputama, apazancas, gehene, and mungruyu, these being the native names for various insects, diseases and other things, for which no equivalent is found in our vernacular.

W. M. DAVIS.

GEOGRAPHICAL RECORD

NORTH AMERICA

LAND SURVEYS IN ALASKA. The U. S. Geological Survey during the present year is making public-land surveys in Alaska under plans approved by the Commissioner of the General Land Office. An appropriation for this work was made at the last session of Congress. The appropriation is being used for subdividing the agricultural lands of Alaska so that they may be taken up by homesteads. The work to be done this season will cover the arable lands around Fairbanks, where many homesteads have already been taken up. A standard parallel and prime meridian will be established and, if time is available, some township lines will be run. The section lines will be run next season. These surveys are being made under the direction of Alfred H. Brooks, in charge of the division of Alaskan mineral resources of the Geological Survey. R. H. Sargent has direct charge of the field operations. He is assisted by C. L. Nelson, W. N. Vance, and S. G. Lunde. Mr. Sargent's party, which sailed from Seattle for Skagway on July 5, includes five or six other assistants, and additional men will be employed at Fairbanks, where horses and supplies will be purchased. The work will be carried on by three parties, each including six to twelve men and six horses. After organizing the work at Fairbanks, Mr. Sargent will go by trail to Valdez. He will make preliminary examinations in the Copper River valley for the purpose of preparing comprehensive plans for land surveys in that region. Mr. Brooks left Washington late in July for Knik and Cook Inlet, to make investigations on which to base land surveys in that district. Later he was to visit the Fairbanks parties. The Superintendent of the Coast and Geo-